Mr. Lewis

E. A. CLARK

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
DISTRICT C

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REPORT OF MULTIPLE FATAL COAL OUTBURST ACCIDENT
NO. 2 MINE
UNITED STATES STEEL CORPORATION, COAL OPERATING DIVISION
GARY, McDOWELL COUNTY, WEST VIRGINIA

June 15, 1956

By

John Zeleskey
Federal Coal-Mine Inspector

and

Edward M. Lewis
Health and Safety Engineer

Originating Office - Bureau of Mines
Mount Hope, West Virginia
W. R. Park, District Supervisor
Health and Safety District C

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INTRODUCTION

A coal outburst occurred on Friday, June 15, 1956, at 10:55 a.m., in No. 3 room in the barrier pillar 18 left off recovery mains in the No. 2 mine, and resulted in the death of 3 men and injury to 1 other. There were 6 men, including the foreman, in the section at the time of the occurrence.

The Mount Hope office of the Bureau of Mines was notified of the outburst at 11:05 a.m., by L. M. Lineberry, assistant general superintendent, and an investigation was made the following day by the representatives of the Corporation, the United Mine Workers of America, and the Bureau of Mines. Representatives of the State Department of Mines made an investigation of the occurrence on the evening of June 15, 1956.

The names and other pertinent information concerning the 3 men killed and the 1 injured are as follows:

Name	Age	Occupation	Dependents	Experience
Killed instantly				
Flay V. Rhodes	44	Loading-Machine Operator	Widow-7 Children	24 Years
Joe Evans	43	Loading-Machine Operator's Helper	Widow-3 Children	25 Years
Died June 17, 1956				
Jess C. Johnson	40	Timberman	Widow-2 Children	23 Years

Hospitalized but recovering satisfactorily

Ernest Keiling Section Foreman

GENERAL INFORMATION

The No. 2 mine was opened by the present operator in 1903 and was entered by 7 drifts and 8 shafts ranging from 74 to 325 feet in depth into the low-volatile bituminous Pocahontas No. 4 coal bed, which averaged 84 inches in thickness in the present working areas. A total of 802 men, 685 underground and 117 on the surface, was employed on 3 shifts a day, 5 days a week. The average daily production was 7,875 tons of coal; about 50 percent of the coal was loaded by caterpillar-tread-mounted permissible-type loading machines and the remainder was loaded by caterpillar-tread-mounted permissible-type continuous miners or mining machines.

The coal bed in the area where the outburst occurred was 78 inches in thickness overlaid by massive sandstone approximately 150 feet in thickness. The total thickness of overburden was 1,440 feet. The floor was hard shale which resisted heaving. The Pocahontas No. 4 coal is very friable and, consequently, crushes more readily than coal in most other coal beds. This factor is detrimental to and imposes greater hazards in the extraction of pillars. Numerous fatalities and much damage to equipment have resulted from coal outbursts or bumps in mines developed in the Pocahontas No. 4 coal bed where mining conditions in pillar areas were conducive to such outbursts. The Nos. 2 and 6 mines in the Gary District have had unfortunate experiences with previous coal outbursts such as: In February 1952, in the No. 2 mine, a pillar exploded which resulted in extensive damage, including the destruction of 26 stoppings. Fortunately no one was on the section at the time. In the No. 6 mine, on February 9, 1953, 2 persons were killed and 2 injured by a coal outburst, in 1945, 3 men were burned by the ignition of gas liberated by a coal outburst, on February 6, 1951, 4 men were killed and 7 injured and on April 19, 1951, 1 man was killed and 4 injured by coal outbursts.

As a result of the foregoing unfortunate experiences with coal outbursts, the management determined to work out a safer method of recovering pillars which were known to be "loaded". Since August 1953, experiments have been conducted toward unloading the internal stress in pillars by horizontal drilling before mining. This has evolved as three major activities:

1. Setting off bumps by triggering them with 6-inch auger holes drilled mainly toward areas known to be "loaded".

2. Probing doubtful blocks of coal with 6-inch auger holes to prove whether or not the blocks are building up pressure; negative proof permits continued orderly mining.

3. Large blocks of coal are to be unloaded gradually by drilling 24-inch auger holes, followed by normal recovery of the blocks.

This work has been a joint activity of operations, engineering and safety, in the Gary District. Until the recent outburst occurred, the experiments had progressed satisfactorily and, regardless of the results of the recent coal outburst, the writers believe that progress has been made toward reducing the hazards of coal bumps while mining "loaded" pillars.

The block of coal being mined was known to be "loaded" as indicated by loose coal sloughed off the periphery of the block, particularly on the gob side. Until recently, an attempt had not been made to mine the block of coal since January of last year because of excessive water. Auger holes had been drilled into the block of coal, as indicated on sketch No. 2, for the purpose of releasing stored up energy. The No. 3 room was following and had advanced to within 23 feet of the inby end of a 24-inch auger hole. Holes were drilled first from the recovery mains side of the pillar and then from the 18 left end of the pillar and was contrary to the usual procedure, which was to auger and mine the coal from the gob end of a pillar; this change in procedure may have been a mistake. It is possible that some parts of the auger holes were not on the floor, thus reducing their effectiveness in releasing energy. Possibly the No. 3 room had advanced too close to the inby end of the auger hole.

The management intends to use a boring-type continuous mining machine to advance a working place into a drilled pillar. The controls of the machine are 20 feet outby the boring head which will permit the operator to work at a safer distance from the face than when operating a conventional loading machine, but it is planned to operate the continuous miner by remote control, using lines attached to the control levers and an extensible belt attached to the machine while the operator is in a crosscut. The crosscuts will be made not over 40 feet apart.

With the present drilling equipment, holes can only be drilled with a clockwise rotation and as a result the auger drifts to the right while being advanced, thus producing a hole which is curved to some extent. This curvature is aggravated by bumps which occur on the left side of the hole and by coal being looser on the right than on the left side of the hole. With the present drilling equipment, the maximum distance that a hole can be advanced under favorable drilling conditions is about 85 feet.

Drilling equipment is on order at a cost of $97,000.00 which will permit drilling 24-inch holes either in a clockwise or counter-clockwise direction and to an expected depth of 160 feet, or through most pillars.

By being able to drill holes with the auger rotating in either direction, it is expected that straighter holes can be drilled. While drilling, the men are protected by a barricade of cribs and boards between the drilling machine and rib.

Information for this report was obtained by an inspection of the scene of the accident and from the following persons:

W. G. Talman	General Superintendent
Martin Hayduk	Mining Engineer
Robert Anderson	Superintendent
Hagy Houck	Assistant Superintendent
Perry Mosely	Mine Foreman
Roy Parsons	Assistant Mine Foreman
Ernest Keiling	Section Foreman
William Maxwell	Shuttle-Car Operator
Sherman Kemp	Motorman

The last Federal inspection of this mine was completed April 14, 1956.

DESCRIPTION OF THE ACCIDENT

The coal outburst occurred about 10:55 a.m. in No. 3 room barrier pillar 18 left off recovery mains. Prior to the outburst, the loading machine was moved about 27 feet from the face and the crew started to timber the roof. Flay V. Rhodes, loading-machine operator, Joe Evans, loading-machine operator's helper, and Jess C. Johnson, timberman, were engaged in timbering the roof at the face while Ernest Keiling, section foreman, was standing 12 feet from the face supervising the work. Rhodes and Evans were near the face and Johnson was about 15 feet from the face. The work of timbering the roof had been completed when the outburst occurred at the face where an auger hole, 24 inches in diameter, had been drilled in advance of the face to relieve the stress. The auger hole had been drilled 75 feet into the block of coal; the No. 3 room was 52 feet in depth, leaving 23 feet of the auger hole in advance of the face. Rhodes and Evans, who were about 39 feet from the face along the side of the loading machine, were thrown by the force and covered by loose coal and coal dust, which was thrown off by the "bump", and were killed instantly.

Johnson, timberman, was seriously injured in the accident and died on June 17, 1956; he was thrown about 12 feet from where he had been standing to the floor between the rib and the loading machine, and he was covered with loose coal and coal dust approximately 3 inches in thickness. Ernest Keiling, section foreman, was carried by the force of the outburst from where he had been standing about 10 feet toward the loading machine; he suffered fractures of the nose, ribs, knee, and shoulder, but was only slightly covered by the loose coal and coal dust.

The amount of coal thrown by the force of the outburst was estimated to be about 3 or 4 tons, which was scattered 16 inches deep on the floor of the place.

William Maxwell, shuttle-car operator, was traveling toward the loading machine and was 150 feet from the machine when the "bump" occurred, but he was not injured.

Sherman Kemp, the motorman on the section, also escaped uninjured; he stated that 7 cars of coal were loaded at the loading ramp prior to the "bump", and that a trip of 8 empty cars had been placed in the loop inby the loading ramp. The ninth car could not be placed in the loop and it was pulled back outby the ramp where the telephone and power switches were installed. It was while Kemp was moving the locomotive and car to this location that the outburst occurred. Kemp, at that moment, pulled the switch cutting off the electric power from the section. When this was done, Kemp went toward the place where the "bump" occurred and found Maxwell, shuttle-car operator, at the check curtain that was torn down at the entrance to No. 3 room. They both went toward the loading machine and called. Foreman Keiling, who was in the dark, answered the call, then he was brought out of the place to the ramp. Johnson was found along the rib covered with loose coal and coal dust. Maxwell removed some of the loose coal and coal dust from the face of Johnson so he could breathe better and then brought him to the ramp. Kemp and Maxwell administered first-aid to the injured and then a telephone message was sent to the surface. The bodies of Evans and Rhodes were removed from under the loose coal and taken to the surface. The doctors, en route to the mine, were stopped at the drift by the dispatcher because the injured men were near the drift at that time. Maxwell, shuttle-car operator, stated that while a second shuttle car of coal was being loaded, a small bump occurred. From 10:20 a.m. until 10:50 a.m., 3 shuttle cars of coal were loaded and during that time about 6 small bumps had occurred at the face where the loading machine was being operated.

Keiling, section foreman, who is at the Grace Hospital in Welch, West Virginia, stated that they got a late start on the morning of June 15, 1956, because the loading machine had to be repaired and loading operations were started at about 10:10 a.m. There were 7 empty cars at the ramp and Keiling instructed Johnson to load the coal at the face, especially on the right side of the place so that timbers could be set. After this was done, 3 posts were obtained, 2 posts were set on the right side of the rib near the face and 1 post was set at the face near the auger hole. Evans was tightening the wedge on one of the posts and Keiling had walked back a short distance toward the loading machine to pick up 2 or 3 wedges off the floor to put in a place where they would not be covered up, when the coal outburst occurred. Keiling said that after he regained consciousness, he tried to free his legs, and

after releasing his right leg, he heard a man breathing as if he was choking. Keiling then cleared some of the loose coal and coal dust from the mouth of Johnson. There was about 3 or 4 inches of loose coal and coal dust over Johnson's face. Keiling stated that he was in the place from the time the loading machine started until the outburst occurred, and that nothing unusual occurred to indicate an impending "bump". Also, none of his crew mentioned anything unusual about the condition of the place.

Section Foreman Matt Novinci was in 13-1/2 left recovery section when the outburst occurred in 18 left. He was notified of the accident and proceeded to the place as quickly as possible and assisted with the rescue operations.

The roof or mine floor was not affected. It was reported that a dense cloud of dust was thrown into suspension by the outburst. The section was well rock-dusted. The timbers in the affected area were not broken or dislodged, except that 2 cribs and a check curtain were knocked down. The loading machine was not damaged. From the appearance of the gob line in the mined-out areas in the 18 left, successful pillar extraction had been accomplished and falls had occurred. However, in view of the thickness of the sandstone roof over the affected area, it is possible that the falls bordering the line of extraction were not of sufficient magnitude to relieve or prevent undue concentration of stress on the next outby blocks of coal, and excessive pressure had built up within the large block of coal into which the rooms were being driven.

CAUSE OF THE ACCIDENT

The cause of the accident was an unexpected violent outburst of coal. The occurrence was unpredictable in the light of present knowledge.

RECOMMENDATIONS

Since all known precautions were taken while mining the block of coal, no recommendations are made other than the proposals made by management. These proposals are:

1. To auger and mine from one end or side of a block of coal.

2. To make sure that the auger holes are on the floor.

3. Working places will not be advanced closer than 30 feet of the inby end of an auger hole.

ACKNOWLEDGMENT

The cooperation of officials and employees during this investigation is gratefully acknowledged.

Respectfully submitted,

/s/ John Zeleskey

John Zeleskey
Federal Coal-Mine Inspector

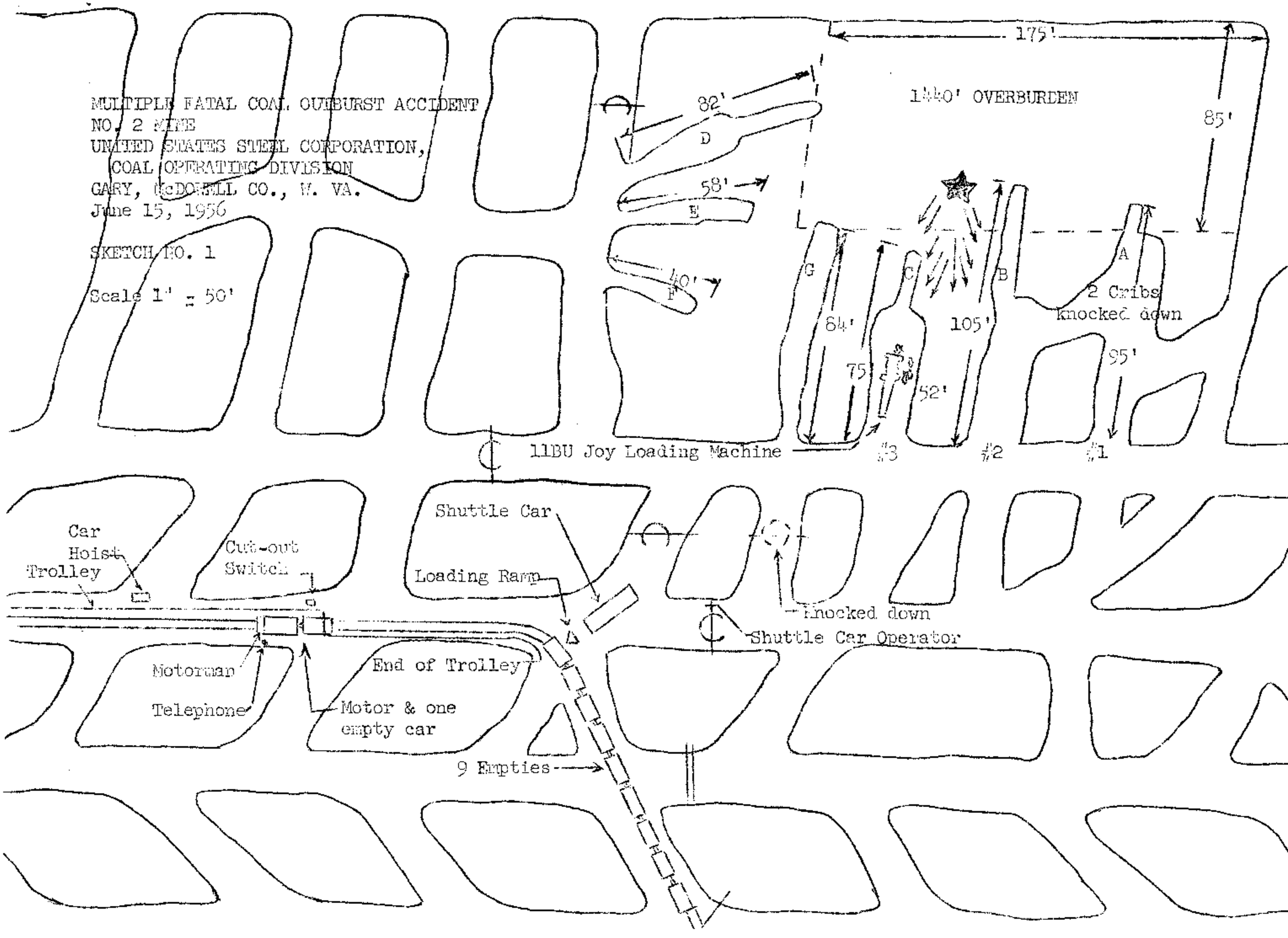
/s/ Edward M. Lewis

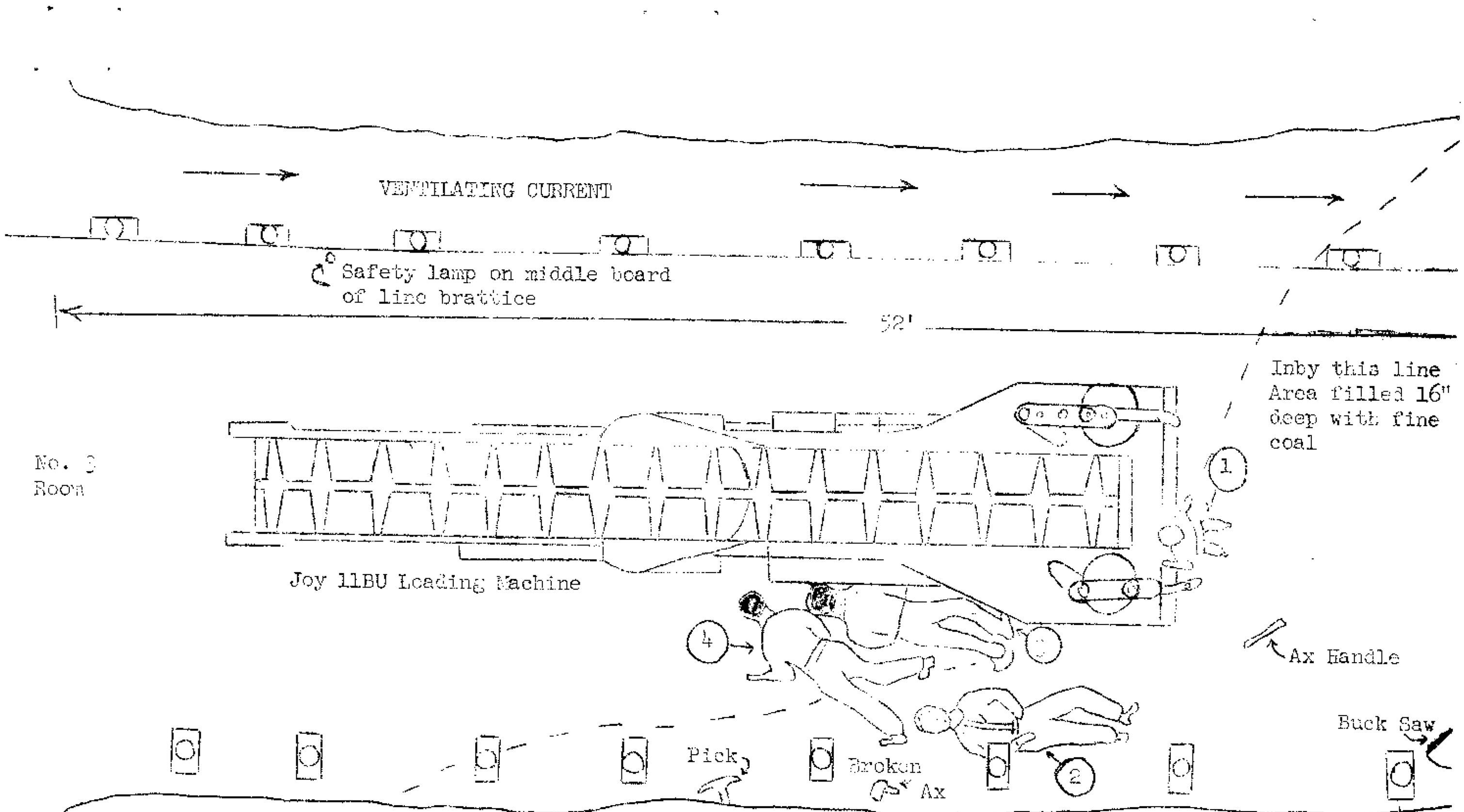
Edward M. Lewis
Health and Safety Engineer

MULTIPLE FATAL COAL OUBURST ACCIDENT
NO. 2 MINE
UNITED STATES STEEL CORPORATION,
COAL OPERATING DIVISION
GARY, McDOWELL CO., W. VA.
June 15, 1956

SKETCH NO. 1

Scale 1" = 50'



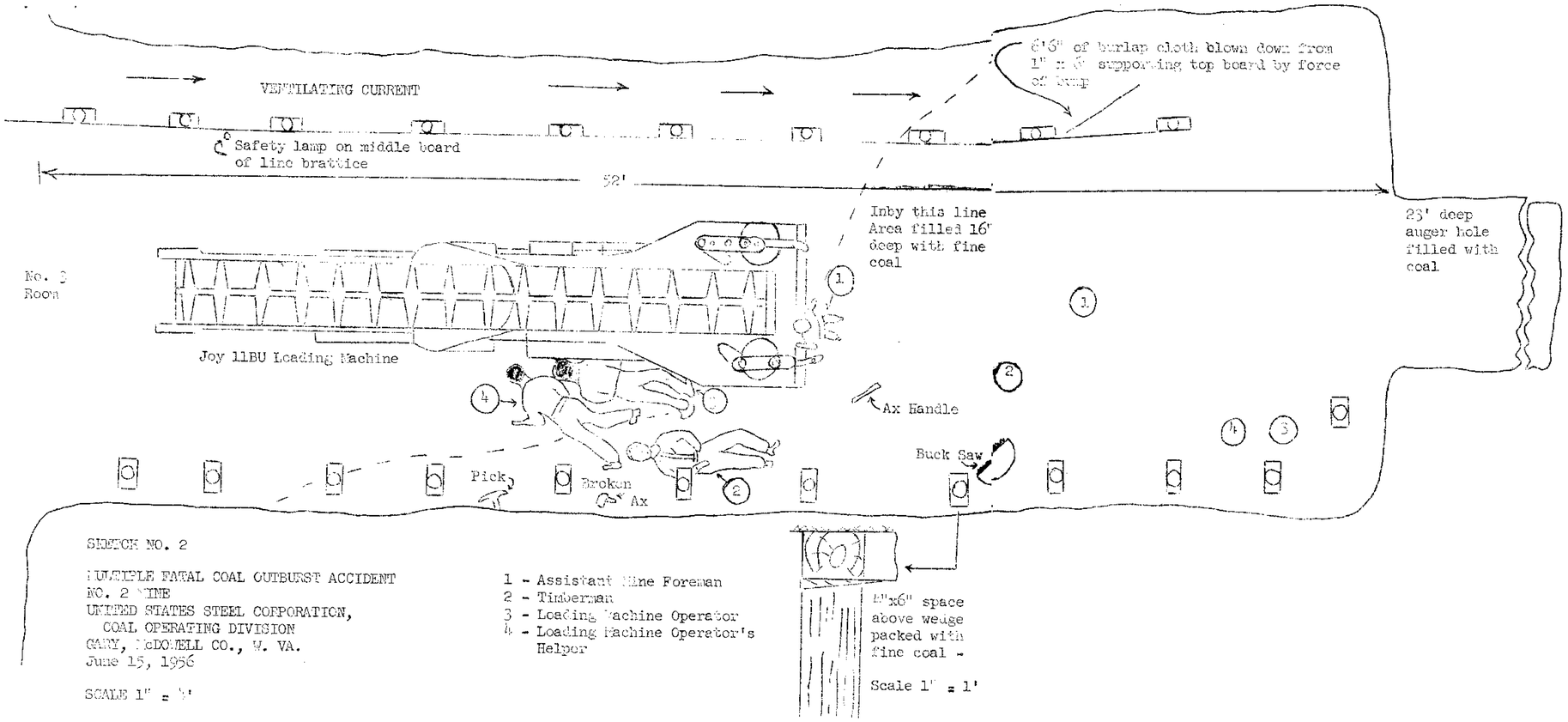


SKETCH NO. 2

MULTIPLE FATAL COAL OUTBURST ACCIDENT
NO. 2 MINE
UNITED STATES STEEL CORPORATION,
COAL OPERATING DIVISION
GARY, McDOWELL CO., W. VA.
June 15, 1956

SCALE 1" = 5'

1 - Assistant Mine Foreman
2 - Timberman
3 - Loading Machine Operator
4 - Loading Machine Operator's Helper



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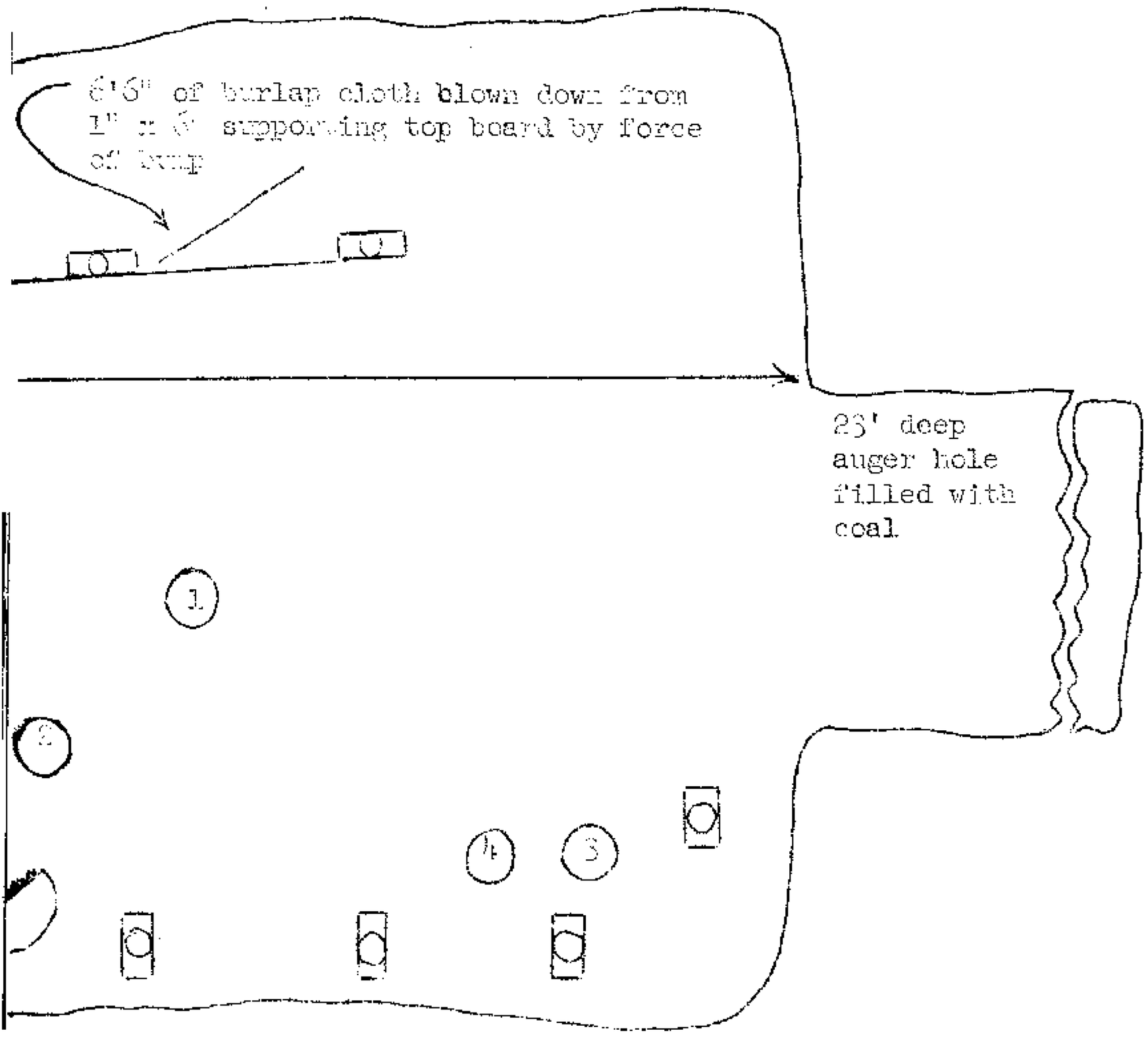
6'6" of burlap cloth blown down from 1" x 6" supporting top board by force of wind
23' deep auger hole filled with coal
1
2
3
4

Joe Evans

MULTIPLE FATAL COAL OUTBURST ACCIDENT DATA SHEET

1. Daily employment: 802 Time: 10:55 a.m. Date: June 15, 1956

2. General location of accident: Face No. 3 room barrier pillar 18 left off recovery mains

3. Job when injured: Timberman Regular job: Loading Machine Operator's/Helper

4. Age: 43 Years experience: Regular job 5 In mines 25

5. Dependents: Widow x Number of children under eighteen 3 Others ____

6. Method of loading in place where accident occurred: Mechanical x Hand into cars or conveyors ____ Other ____

7. Location: Face x Room ___ Haulageway ___ Idle Workings ___ Others ___

8. Type of permanent support in use at location where accident occurred: Posts x Crossbars ___ Bolts ___ None ___

9. Type of temporary support in use in place where accident occurred: Posts x Crossbars ___ Jacks ___ None ___

10. Did injury occur inby last permanent roof support? Yes ___ No x

11. Average distances from last supports to face: Permanent 24" Temporary ____

12. Was standard support plan adopted? Yes Was it followed in this place? Yes

13. Last prior visit by mine officials: Date 6-15-56 Time Official in place when accident occurred - 10:55 a.m.

14. Approximate size of fall in inches: No rock fall - Coal outburst - Estimated 3-4 tons

Jess C. Johnson

MULTIPLE FATAL COAL OUTBURST ACCIDENT DATA SHEET

1. Daily employment: 802 Time: 10:55 a.m. Date: June 15, 1956

2. General location of accident: Face No. 3 room barrier pillar 18 left recovery mains

3. Job when injured: Timberman Regular job: Same

4. Age: 40 Years experience: Regular job ____ In mines 23

5. Dependents: Widow x Number of children under eighteen 2 Other ____

6. Method of loading in place where accident occurred: Mechanical x

Hand into cars or conveyors ____ Other ____

7. Location: Face x Room ____ Haulageway ____ Idle Workings ____ Others ____

8. Type of permanent support in use at location where accident occurred:

Posts x Crossbars ____ Bolts ____ None ____

9. Type of temporary support in use in place where accident occurred:

Posts x Crossbars ____ Jacks ____ None ____

10. Did injury occur inby last permanent roof support? Yes ____ No x

11. Average distances from last supports to face: Permanent 24"

Temporary ____

12. Was standard support plan adopted? Yes Was it followed in this place? Yes

13. Last prior visit by mine officials: Date 6/15/56 Time Official in place when accident occurred - 10:55 a.m.

14. Approximate size of fall in inches: No rock fall - Coal outburst

Estimated 3-½ tons.

Flay V. Rhodes

MULTIPLE FATAL COAL OUTBURST ACCIDENT DATA SHEET

1. Daily employment: 802 Time: 10:55 a.m. Date: June 15, 1956

2. General location of accident: Face No. 3 room barrier pillar 18 left off recovery mains

3. Job when injured: Timberman Regular job: Loading-Machine Operator

4. Age: 44 Years experience: Regular job 5 In mines 24

5. Dependents: Widow x Number of children under eighteen 7 Other

6. Method of loading in place where accident occurred: Mechanical x Hand into cars or conveyors Other

7. Location: Face x Room Haulageway Idle Workings Other

8. Type of permanent support in use at location where accident occurred: Posts x Crossbars Bolts None

9. Type of temporary support in use in place where accident occurred: Posts x Crossbars Jacks None

10. Did injury occur inby last permanent roof support? Yes No x

11. Average distances from last supports to face: Permanent 24" Temporary

12. Was standard support plan adopted? Yes Was it followed in this place? Yes

13. Last prior visit by mine officials: Date: 6-15-56 Time: Official in place when accident occurred - 10:55 a.m.

14. Approximate size of fall in inches: No rock fall - Coal outburst Estimated 3-4 tons

Injury:	Fracture of nose; fracture of acromion process (tip right shoulder); fracture 2nd, 3rd and 4th ribs, right side, fracture 2nd metacarpal, left hand; and, slight fracture interspinous process left tibia at knee
Date and time of accident:	June 15, 1956 - 10:55 A.M.
Location of accident:	Room No. 3 in barrier pillar left off Recovery Headings
Primary cause of accident:	Struck by sudden outburst of coal from advancing room face
Underlying cause of accident:	Concussion and blasting effect of coal displaced from stressed area
Witness:	None
Indirect witnesses:	William E. Maxwell, shuttle car operator Sherman Kemp, motorman
Investigating Committee:	Woods G. Talman, General Superintendent C. W. Connor, Jr., Assistant General Superintendent R. B. Anderson, Mine Superintendent Perry Mosley, General Mine Foreman Roy Parsons, Asst. General Mine Foreman Matt Novince, Assistant Mine Foreman John Schroder, Chief Engineer Martin Hayduk, Mining Engineer G. H. Sambrook, Director of Mine Inspection G. T. Gillison, Chief Mine Inspector John Povlich, Mine Inspector E. M. Lewis, Federal Mine Inspector John Zeleskey, Federal Mine Inspector John H. Johnson, State Mine Inspector-at-large R. H. Maberry, State Mine Inspector John Anderson, Chairman, Mine Safety Committee E. M. Woodruff, Mine Safety Committeeman J. C. Blair, Mine Safety Committeeman

Circumstances:

A mountain bump occurred in the barrier pillar under advance development causing loosened coal to be thrown violently from the faces of Nos. 2 and 3 rooms.

Seven auger holes had been drilled to relieve the internal stresses within the pillar and Rooms 1 and 2 had been developed with one open breakthrough in each room. The advance of Room 3 was begun the previous day and was following a hole, drilled 75 feet deep with a 24 inch diameter auger, into the seam of coal.

Injury:	Fracture of nose; fracture of acromion process (tip right shoulder); fracture 2nd, 3rd and 4th ribs, right side, fracture 2nd metacarpal, left hand; and, slight fracture interspinous process left tibia at knee
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Primary cause of accident:	Struck by sudden outburst of coal from advancing room face
Underlying cause of accident:	Concussion and blasting effect of coal displaced from stressed area
Witness:	None
Indirect witnesses:	William E. Maxwell, shuttle car operator Sherman Kemp, motorman
Investigating Committee:	Woods G. Talman, General Superintendent C. W. Connor, Jr., Assistant General Superintendent R. B. Anderson, Mine Superintendent Perry Mosley, General Mine Foreman Roy Parsons, Asst. General Mine Foreman Matt Novince, Assistant Mine Foreman John Schroder, Chief Engineer Martin Hayduk, Mining Engineer G. H. Sambrook, Director of Mine Inspection G. T. Gillison, Chief Mine Inspector John Povlich, Mine Inspector E. M. Lewis, Federal Mine Inspector John Zeleskey, Federal Mine Inspector John H. Johnson, State Mine Inspector-at-large R. H. Maberry, State Mine Inspector John Anderson, Chairman, Mine Safety Committee E. M. Woodruff, Mine Safety Committeeman J. C. Blair, Mine Safety Committeeman

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Seven auger holes had been drilled to relieve the internal stresses within the pillar and Rooms 1 and 2 had been developed with one open breakthrough in each room. The advance of Room 3 was begun the previous day and was following a hole, drilled 75 feet deep with a 24 inch diameter auger, into the seam of coal.

A crew of five men, under the supervision of an assistant mine foreman, were engaged in the room advance, loading coal directly with a Joy loading machine into a shuttle car. Seven shuttle cars had been loaded and transported to the loading point and six shuttle car loads had been discharged into a seven mine car trip.

Sherman Kemp, motorman, and William E. Maxwell, acting brakeman, pulled and stored the loaded trip in 17 Left. Returning with ten empty cars, nine were placed on the tail track at the loading point and Maxwell uncoupled one car and the locomotive.

During the loading operations the three deceased persons were present in the room. After the seventh shuttle car had been loaded, the assistant mine foreman approached the face to supervise timbering. Rib posts along the right rib and a safety post near the right side of the face had been erected. He stated that Rhodes and Evans were tightening the wedge over the last post along the right rib. Johnson was picking up ends cut from the sawed posts and Keiling was standing about twelve feet inby the loading machine. While these were thus employed at that moment, Kemp was seated in the deck of the locomotive and Maxwell was walking near the loaded shuttle car when the bump occurred, throwing fragments of coal violently from the face of No. 3 room. The four men in the room were struck by the outburst of coal, moved forcibly backwards from their respective locations and thrown to the mine floor.

Maxwell was between the loaded shuttle car and a check curtain on the main heading and Kemp had moved and stopped the locomotive opposite the telephone. Maxwell advanced to the entrance of the room and called to the face area, receiving a cry for help from Keiling. He went directly to the scene and observed the bodies of Rhodes and Evans alongside the loading machine.

Following the bump, Kemp immediately disconnected the power from the section, then followed and encountered Maxwell in the room. Keiling was found near the right side of the loading head of the machine and Johnson alongside the right rib. Maxwell assisted Keiling to walk to the loading point and returned to help extricate Johnson from under loose coal. A stretcher was obtained and these two carried Johnson out on the heading. Kemp telephoned the dispatcher and arrangements were made for a crew of men, under the supervision of Matt Novince, to proceed directly to the scene. Following first aid the injured and the deceased men were transported to the surface.

The rupture of the pillar displaced a larger amount of coal from the left rib of No. 2 room and dislodged three cribs erected preliminary to the resumption of augering operations. A section of burlap line brattice was torn loose between the last two posts erected on the left side of No. 3 room.

In the augering operations, bumps were activated in drilling hole "B" in Room 2 on March 7, 1956 and hole "E" on May 28, 1956.

The No. 3 room advance was 52 feet inby the side of the pillar and the augered hole penetrated 23 feet beyond the face of the room.

Conclusions:

1. Previous augering experience indicated stresses had been relieved in the area so that room advance and a breakthrough to Room 2 could be accomplished with no difficulty encountered.

2. The approved augering plan and subsequent room development were being carried out by mine management and the workmen in exact detail.

3. The room advanced in a highly stressed area resulting in a bump occurrence of great intensity that was unpredictable.

4. All persons in the immediate area were fatally or seriously injured by flying coal and the accompanying wind blast.

Recommendations:

1. Maintain open augered holes not less than thirty-five feet ahead of the maximum point of room development.

2. Verify that auger holes have cut through bone and bottom coal to mine bottom.

3. Hold number of men in face area of such condition to minimum at all times.

4. Investigate use of one form of continuous miner, with maximum operator protection.

Signed: Geo. T. Gillison
Chief Mine Inspector

Signed: C. W. Connor, Jr.
Assistant General Superintendent

Approved: Woods G. Talman
General Superintendent